

TMD DISCUSSION PAPER NO. 34

**TRADE LIBERALIZATION AND REGIONAL INTEGRATION:
THE SEARCH FOR LARGE NUMBERS**

**Sherman Robinson
International Food Policy Research Institute**

**Karen Thierfelder
U.S. Naval Academy**

**Trade and Macroeconomics Division
International Food Policy Research Institute
2033 K Street, N.W
Washington, D.C. 20006 U.S.A.**

January 1999

TMD Discussion Papers contain preliminary material and research results, and are circulated prior to a full peer review in order to stimulate discussion and critical comment. It is expected that most Discussion Papers will eventually be published in some other form, and that their content may also be revised.

Trade Liberalization and Regional Integration: The Search for Large Numbers

Sherman Robinson
International Food Policy Research Institute

Karen Thierfelder
U.S. Naval Academy

January 1999

Paper presented to the meetings of the International Agricultural Trade Research Consortium (IATRC), Florida, December 1998.

Table of Contents

I. Introduction	1
II. Empirical Evidence of Increased Regional Trade	2
III. Trade Creation and Trade Diversion	4
A. Theory	4
B. Empirical Evidence	6
IV. Where are the Big Numbers?	9
A. New Trade Theory	10
B. Smith versus Ricardo	11
V. Membership Issues	12
VI. What do RTAs Mean for Agriculture?	14
VII. Conclusions	15
References	17
Table 1: Summary of Selected Empirical Studies of Regionalism	21

Abstract

The debate over the impact of regional trade agreements (RTAs) on world welfare hinges upon (1) whether they are net trade creating or trade diverting and (2) whether they impede multilateral trade liberalization. Theoretical models are ambiguous on these issues. We summarize the insights from the vast body of empirical literature on multi-country CGE models which analyze RTAs. The empirical models overwhelmingly show that aggregate trade creation dominates trade diversion. Indeed, in many cases, there is no absolute aggregate trade diversion from an RTA. The models also indicate that welfare for all members — both current and potential — increases when RTAs expand. There are even bigger welfare gains when models incorporate aspects of “new trade theory” such as increasing returns, imperfect competition, technology transfers, trade externalities, and dynamic effects such as links between trade liberalization, total factor productivity growth, and capital stock accumulation. We broaden the search for large numbers by suggesting an additional gain from RTAs. We conjecture that increases in intra-sectoral trade arise from the fact that an RTA provides an expanded secure market, and permits firms to pursue economies of fine specialization. This Smithian specialization in production is another source of efficiency gains.

I. Introduction

In recent years, regional free trade agreements have proliferated.¹ Some, such as the North American Free Trade Agreement (NAFTA), involve a developing country (Mexico) liberalizing trade and deepening links with developed countries (the United States and Canada). The expansion of the European Union (EU) to include, first, countries such as Spain, Portugal, and Ireland; and, second, central European countries, similarly expands links between developing and developed countries — although the gaps are not as great as that between Mexico and the U.S. Other arrangements, such as Mercosur, involved deepening integration among developing countries. Many of these new regional integration schemes have evolved during the Uruguay Round of GATT negotiations, which continued the postwar trend of global trade liberalization and also expanded the sectoral coverage to include agriculture.

The various approaches to trade liberalization that have emerged in recent years have revived the debate over the welfare implications of regional trade agreements (RTAs) and their impact on the global economy. One school of thought [Bhagwati and Panagariya (1996), Bhagwati and Krueger (1995), Srinivasan (1998)] views RTAs as a bad idea, reducing welfare for their members and detracting from efforts to expand global liberalization under the new World Trade Organization (WTO). Others, such as Ethier (1998), argue that RTAs reflect a “new regionalism” which complements multilateralism and that they are evidence that small countries want to participate in a multilateral system currently dominated by developed countries. Another issue is the importance of proximity. Krugman (1993) notes that there are natural trading blocs among neighboring countries — low transportation costs contribute to welfare gains when these countries form an RTA. There is also a view that countries seek to join RTAs because of fear of exclusion — the domino theory of regionalism described by Baldwin and Venables (1995).

In this debate, there are three important issues which can only be resolved with empirical models. First, do RTAs increase welfare? Trade theory is ambiguous on this point, noting that there can be both trade creation which increases welfare and trade diversion which can reduce welfare. Theory offers few insights as to which change will dominate. Second, where are the big numbers? Empirical studies of growth in both developing and developed countries support the view that trade liberalization policies have led to increased trade and have been associated with

¹See Burfisher and Jones (1998, p. 11, table 1) for a detailed description of the types of regional trade agreements and the degree of integration in each. Vollrath (1998) summarizes the country composition and agricultural trade policies of six major RTA's: the European Union (EU), Closer Economic Relations (CER, between Australia and New Zealand), Canada-U.S. Free Trade Agreement (CUSTA), Mercosur, ASEAN (Association of Southeast Asian Nations) Free Trade Area (AFTA), and Asia-Pacific Economic Cooperation (APEC) Forum, a prospective RTA. Likewise, Sheffield (1998) describes of country coverage and agricultural trade policies for a detailed list of RTAs.

welfare gains and more rapid growth. What are the sources of these gains? Finally, do RTA's hinder or help multilateral free trade? On this point, empirical models can show the effects of being excluded from an RTA and also consider the impact on member countries of joining an RTA compared to further global liberalization.

In this paper, we summarize empirical evidence of the increased importance of regional trade. Then we review theoretical and empirical models of RTAs. We also briefly review “new trade theory” models which incorporate links between increased trade and economic performance beyond the standard Ricardian theory of comparative advantage. We then consider the voluminous empirical literature analyzing the impact of RTAs.² The results from a large number of model-based empirical studies strongly support a few robust conclusions about RTAs: (1) they increase welfare of participating countries; (2) aggregate trade creation is much larger than trade diversion; (3) the big numbers appear in models that incorporate features of new trade theory; (4) there are welfare gains from expanding membership; and (5) global trade liberalization increases welfare more than the formation of an RTA.

II. Empirical Evidence of Increased Regional Trade

Analysis of trade data found in various studies suggests intra-regional trade has become more important over time. For example, Frankel, Stein and Wei (1994) find that intra-regional trade as a share of total trade of the region has increased from 1965 to 1990 among Andean countries (from 0.8 to 2.6 percent), the EC12 (from 35.8 to 47.1 percent) and East Asian countries (from 19.9 to 29.3 percent). In addition to examining trends in the data, Frankel and others use the gravity model to decompose the effects of economic size, distance and the existence of a regional trade agreement between partners on bilateral trade on trade. They find that the dummy variables for intra-regional trade are highly statistically significant. They conclude that, “The gravity model results thus show that statistically significant regional trading arrangements are indeed springing up in a number of places.” (p. 73).

Yeats (1998) finds evidence of increased intra-Mercosur trade from 1979–1994, noting that trade preferences in the region were introduced in June 1991. In some cases, the changes are dramatic, with Argentina's share of exports to Mercosur countries increasing from 13.4% to

²This empirical literature is seldom cited by those taking a dim view of RTAs. For example, Srinivasan (1998, p. 61) states that the issue of whether or not RTAs are beneficial, including the crucial question of whether trade creation exceeds trade diversion, “. . . is simply a set of empirically testable, though as yet untested, hypotheses.” This statement is hard to justify given the volume of empirical work on this issue.

30.4%. Exports from individual Mercosur countries to Europe declined slightly while exports from these countries to the United States increased slightly over the same time period.³

Focusing on agriculture, Vollrath (1998) describes the intra-regional trade patterns for six regional trade areas — AFTA, APEC, CER, CUSTA, EU, and Mercosur.⁴ He finds that the countries included in these RTAs account for a stable share of global agricultural trade from 1970 - 95. However, collectively, their share of intra-regional to global trade increased 10% over the period, suggesting that world agricultural trade has become more regional. Then he examines the share of intra-regional imports to total imports for each region. He finds an increase in intra-regional trade in the EU, CUSTA, CER, Mercosur, and APEC. In AFTA, regional trade dependence in agriculture has declined, as countries have similar endowments and production patterns and little incentive for agricultural trade among members

Hertel, Masters, and Gehlhar (1997) also describe trends in agricultural trade in RTAs and find empirical evidence of increased regional trade. They calculate the shares of world trade in farm goods — grains, oilseeds, fruits and vegetables, sugar, and livestock products — that is accounted for by intra-regional trade in three trading regions, EU12, NAFTA, and APEC. Over the 1962-95 period, intra-regional food trade increased in each region (although the gains in NAFTA are slight).

In some RTAs, there is evidence that there has been significant increases in intra-industry trade. For example, this trend has been occurring in trade between the U.S. and Mexico since Mexico unilaterally liberalized in the mid-1980s, and has accelerated since the formation of NAFTA. The formation of the European Common Market also led to significant increases in intra-industry trade [Grubel and Lloyd (1971)]. It is a common observation that much of the increased trade volume in the world economy has occurred among the developed countries, rather than between developed and developing countries. In a neoclassical trade model, one would expect to see more trade between countries with dramatically different factor proportions, but the “stylized facts” indicate that most trade creation has occurred among countries with relatively similar factor endowments. In terms of analyzing the impact of the formation of RTAs, one must

³Yeats (1998) also uses trade data to compute intensity of trade indices which indicate that Mercosur members are becoming more dependent on trade with one another.

⁴The 18 original APEC countries are Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Malaysia, Mexico, New Zealand, Papua New Guinea, Philippines, Singapore, South Korea, Taiwan, Thailand, and the United States. Russia, Peru and Viet Nam joined in 1998. The AFTA countries are Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand. The CER countries are Australia and New Zealand, The CUSTA countries are Canada and the United States. The EU countries are Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, and the United Kingdom. The Mercosur countries are Argentina, Brazil, Paraguay, and Uruguay (from Vollrath, 1998)

keep in mind that wide differences in factor endowments may not be the chief force behind increases in trade volumes.

Given the evidence of increased intra-regional trade, the next question is, does this come at the expense of trade with the rest of the world, as some researchers argue? We next consider trade creation/ trade diversion issues at the theoretical and empirical levels.

III. Trade Creation and Trade Diversion

A. Theory

Bhagwati and Panagariya (1996) and Panagariya (1998, 1996) argue that RTAs will likely reduce welfare in member countries and impede multilateral trade liberalization. Because RTAs give preferential treatment to member countries, they divert trade from non-member, least-cost suppliers. They argue that this trade diversion is likely to dominate trade creation, so the RTA will reduce welfare in member countries.⁵ To illustrate the trade diversion effects of an RTA, they present Viner's model of a customs union in which two countries remove bilateral tariffs. When the rest of the world is the least cost supplier and faces constant costs, an RTA with the supplier who faces increasing costs can only divert trade. The liberalizing country loses because it foregoes tariff revenue from the new union member but does not face a lower internal price for the imported good, since the rest of the world is the price setter. In this framework, the larger is the trade partner as a share of total imports, the bigger the tariff revenue loss when an RTA is formed. Similarly, the trade partner who initially has higher tariffs loses from an RTA because more tariff revenue is redistributed away from it.⁶

In contrast, when the union partner is the supplier facing constant costs, an RTA improves welfare in the liberalizing country. It benefits from the price reduction and still collects tariff revenue from the countries excluded from the union. There is only trade creation from the RTA. As Panagariya (1996) notes, this case is even better than multilateral tariff elimination due

⁵Wonnacott (1996) notes that trade diversion is not necessarily welfare-decreasing by definition. Instead, he argues that trade diversion may increase welfare for the diverting country and the world as a whole. Trade liberalization between partners in an RTA may lead to increased competition and specialization; firms can exploit economies of scale when they have a bigger market and the partner country may become the least cost supplier in this environment. This is really a “new trade theory” argument.

⁶Mexico faced these conditions before entering NAFTA — it had a high share of trade with the U.S. and had higher tariffs than the U.S. Bhagwati and Panagariya (1996) argue that this suggests Mexico will lose from NAFTA because of foregone tariff revenue from trade diversion. As we will show below, they are wrong. The empirical evidence shows that NAFTA is net trade creating and that welfare for all members increases.

to the tariff revenue collected. However, he argues it is usually the case that the rest of the world, not the union partner, faces constant costs while union members face increasing costs. While there will be trade creation for some commodities, the majority of goods will come from a partner with increasing costs — trade diversion will dominate in most RTAs.⁷

De Melo et al. (1993) note that the case of pure trade diversion, emphasized in Panagariya (1996 and 1998), while unambiguously welfare-worsening, is too extreme a model to characterize actual RTAs.⁸ They present a more balanced view of the welfare effects of an RTA in an analytical model in which integration both creates and diverts trade. In this case, the country which lowers its barriers against a trade partner faces a new domestic price which is lower than the tariff-inclusive mark-up over the constant cost supplier (the rest of the world), but higher than the free trade price. The welfare effects on the tariff-reducing country are ambiguous: it loses because it has diverted all imports from the lowest cost supplier, but it benefits because total imports have increased. De Melo and others note that, in this environment: (1) the higher the initial tariff on a given sector, the larger the benefits and the smaller the costs of an RTA; (2) the lower the post-RTA tariff on non-union countries, the less likely that the lower-priced goods of the latter will be displaced; and (3) the greater the complementarity in import demands between the union partner, the greater the gains from an RTA. The latter point suggests that there are large gains from an RTA between developed and developing countries — such as the U.S. and Mexico — which have different factor endowments. Determining the net welfare impact of an RTA in this model is an empirical issue.

Like de Melo et al., De Rosa (1998) provides a balanced survey of theoretical models that allow for both trade creation and diversion when an RTA is formed either with a partner facing either constant or increasing cost. In addition to describing the effects of an RTA in Viner's partial equilibrium model, De Rosa presents Meade's model in which both international and domestic relative prices can adjust in a general equilibrium framework. One result from the Meade model which is relevant to the debate over trade creation and diversion is that if a country entering a regional trade agreement increases its imports from all sources, its welfare will improve. To insure that there is no trade diversion — and hence that the country entering the RTA can improve its welfare — De Rosa recommends that member countries of a new trading bloc should simultaneously reduce trade barriers with non-member countries. The idea is important — formation of an RTA in an environment of continuing multilateral liberalization may well have different welfare implications than forming an RTA in an increasingly protectionist environment.

⁷Panagariya uses a stylized model to argue that NAFTA will cost Mexico, the country with the highest initial tariffs, \$3.25 billion in lost tariff revenue per year.

⁸See also Winters (1996) for a discussion of the theory with models that allow both trade creation and trade diversion.

B. Empirical Evidence

The theoretical models suggest that the net impact of an RTA on trade creation and trade diversion is ambiguous. It depends on the export capacity of the partner country and whether the partner country faces constant cost. Furthermore, as Panagariya (1998) notes, an RTA can be net trade-creating in one sector and net trade-diverting in another sector. To determine the implications of an RTA for aggregate welfare and trade patterns, one needs economywide, multi-sectoral, computable general equilibrium (CGE) models.

There is now a large empirical literature using multi-country CGE models to analyze the impact of regional trade agreements. We will summarize conclusions from various surveys of this literature and discuss representative studies.⁹ See Annex 1 for a summary table of results from additional models. As we will note below, multi-country CGE models differ widely in terms of country and commodity coverage, assumed market structure, policy detail, and specification of macroeconomic closure. In spite of these differences, surveys of these models support two general conclusions about the empirical effects of regional trade agreements: (1) in aggregate, trade creation is always much larger than trade diversion; and (2) welfare — measured in terms of real GDP or equivalent variation — increases for member countries.

Brown (1993) surveys early CGE models of the North American Free Trade Agreement (NAFTA). She describes three classes of models: (1) static models with constant returns to scale technology and perfectly competitive goods markets (the neoclassical model); (2) static models with increasing returns to scale; and (3) dynamic models. In the static models with constant returns to scale technology, there are small welfare gains, measured as an increase in real income, from the formation of NAFTA. The gains are positive for both countries, but Mexico's gains are relatively much bigger. With regards to trade diversion, Brown notes:

“The negative consequences of an agreement for the ROW are not expected to be very important. U.S. tariffs and nontariff barriers against Mexico are already quite low, thus minimizing the distortion effects associated with a preferential tariff. Mexico's trade barriers are higher, but a very large fraction of Mexico's trade is

⁹We review eight surveys: Baldwin and Venables (1995), 6 studies; Brown (1993), 12 studies; Burfisher and Jones (1998), 11 studies; DeRosa (1998) 15 studies; Francois and Shiells (1994), 10 studies; Hertel (1997) and others 7 studies; U.S. International Trade Commission (1998) 6 studies; and U.S. International Trade Commission (1992) 10 studies. While there is some overlap in terms of the models included in these surveys, we draw our conclusions from a total of 77 studies.

already directed toward the United States. Consequently, there is very little trade with the ROW to divert.” (p. 40.)¹⁰

The U.S. International Trade Commission (1992) also surveys CGE models of NAFTA.¹¹ Like Brown (1993), the survey acknowledges the variety of structural features in the models in terms of the number of sectors, number of primary factors, market structure, macroeconomic assumptions (model closure), and policy instruments. Despite the diversity of the models, the report notes that:

“... these studies uniformly demonstrate that all three countries would benefit from a NAFTA, as shown by increases in welfare and real GDP. Mexico stands to gain the most, with estimated welfare increases ranging from 0.11 to 5.0 percent. Mexican real GDP increases by 0.01 to 11.39 percent. The United States would gain 0.07 to 2.55 percent in welfare and real GDP would increase by 0.02 to 2.07 percent. Most studies show smaller gains for Canada than for Mexico, with welfare changes of 0.03 to 6.75 percent and increases in real GDP ranging from 0.12 to 10.57 percent.” (pps. 6-14).

Francois and Shiells (1994) elaborate upon the features of CGE models used to analyze NAFTA, noting that the theoretical structure of the models influences the simulation results. They comment on the differences in demand specifications (Armington versus monopolistic competition, choice of functional form), market structure (perfect competition versus imperfect competition), closure rules (international capital mobility, migration, full employment versus fixed wage, and the trade balance), and inter-temporal structure (static versus dynamic). In terms of welfare, they find:

“... without exception, simulations based on these models show that Canada, Mexico and the United States all stand to gain from NAFTA, although the welfare gains are modest as a percent of GDP. Mexico appears to have the most to gain with percentage changes in welfare on the order of 1 to 5 percent.” (p. 40).

¹⁰Brown's perspective contradicts Bhagwati and Panagariya (1996) who argue that the same conditions — high trade shares with the U.S. and high tariffs — mean Mexico loses from NAFTA because of trade diversion and the loss of tariff revenue (p. 18). The difference between the two approaches is the underlying assumption about the analytical model. Brown presumes both trade creation and trade diversion are possible while Bhagwati and Panagariya presume trade diversion dominates.

¹¹This report is a critical review and summary of a symposium held at the U.S. International Trade Commission, February 1992. The Symposium was based on a request from the United States Trade Representative to investigate the technical merits and major findings of economy-wide modeling of the economic implications of NAFTA.

Other survey articles such as Baldwin and Venables (1995) and DeRosa (1998) do not have a regional focus but rather describe a few articles describing results for each region. DeRosa provides a summary table with changes in trade flows and economic welfare for studies of NAFTA, Asean Free Trade Area (AFTA), an Asian-Pacific Free Trade Area, a greater North American Free Trade Area, Mercosur, Chilean accession to Mercosur, and NAFTA. For all studies that describe changes in intra-bloc and extra-bloc imports, trade creation exceeds trade diversion. In general, there are welfare gains to member countries.¹²

Baldwin and Venables (1995) provide a summary of the theoretical issues relating to RTAs as well as a survey of some empirical studies.¹³ They note that studies of EC92, which removed nontariff barriers to trade in the EC (modeled as reduction in intra-EC trade costs), the EC gains modestly.¹⁴ There are small negative welfare effects on EFTA.¹⁵ However, when the EC92 is extended to EFTA countries there are gains to both the EC and the EFTA.

Lewis and Robinson (1996) and Lewis, Robinson, and Wang (1995) developed multi-country CGE models to analyze the potential impact of APEC and ASEAN.¹⁶ Their results indicate:

- The formation of and APEC of ASEAN regional trade agreement would generate increases in welfare for member countries.
- Aggregate trade creation is much larger than trade diversion.

¹²DeRosa describes two cases in which a country modeled or the rest of the world experiences a welfare decline. In Lewis and Robinson (1996) there is a slight decline in China's welfare when they model Afta, the elimination of all tariff and nontariff barriers to imports among Asean countries. In Harrison, Rutherford, and Tarr (1997), Chile experiences a welfare decline when it joins Mercosur. This can be explained by the high external tariffs Chile must adopt against the rest of the world.

¹³Their discussion of the CGE models of NAFTA come from the surveys in the U.S. International Trade Commission (1992) and Francois and Shiells (1994) which are also described earlier in this paper.

¹⁴They note that these studies focus on manufacturing, approximately one third of EC GDP; they may understate the effects of EC92 which also affects services trade and financial market liberalization.

¹⁵They attribute the loss to EFTA to product shifting in models that have imperfect competition.

¹⁶See Annex 1 for a summary of the features of these models and all other individual studies to which we refer later in the paper.

- In the case of APEC, excluding a major country such as the U.S., Japan, or China from membership would lead to lower welfare for the remaining members as well as for the excluded country.
- In the case of ASEAN, it is better for the member countries to include at least one large, preferably developed country in the RTA.
- Even with the formation of an RTA, multilateral trade liberalization increases welfare for both member and non-member countries. The formation of an RTA is thus consistent with further multilateral trade liberalization.

These results are consistent with many other studies surveyed.

In summary, empirical studies of RTAs using multi-country models such as CGE models that are general enough to incorporate both trade creation and trade diversion overwhelmingly find that aggregate trade creation is much larger than trade diversion and that the RTAs increase welfare. While trade diversion can be shown to dominate in some analytical models, there is no empirical evidence that this will be the case in any of the general equilibrium models examined. Given the large body of empirical work showing that trade creation dominates trade diversion in RTAs, Bhagwati and Panagariya, who use theoretical models that focus on trade diversion to argue that RTAs are a bad idea, appear to be tilting at windmills of their own creation.

Similarly, partial-equilibrium models seem inappropriate for the empirical analysis of the net welfare impact of the formation of an RTA. For example, Yeats (1998) analyzes the effect of Mercosur on trade in industries classified at the three-digit SITC code level. He calculates two indices — regional trade dependence and revealed comparative advantage. He finds that Mercosur countries have increased regional trade in commodities inconsistent with comparative advantage. On this basis, he concludes that Mercosur is trade diverting and potentially harmful to the member countries. However, his analysis is not comprehensive in that it does not measure aggregate trade creation and welfare changes in Mercosur. On the other hand, all economy-wide studies show that Mercosur is net trade creating and welfare-increasing in the aggregate.¹⁷ While it is useful to analyze the impact of RTAs on individual sectors, it is not possible to use such studies to make conclusions about the impact of an RTA on aggregate welfare.

IV. Where are the Big Numbers?

Much of the theoretical analysis of the potential impact of trade liberalization has been done using neoclassical trade models. In this approach, the gains from increased trade can be seen as “Ricardian” in that they arise from countries being able to pursue comparative advantage based on having different factor endowments. Is this the correct framework to show the effects of RTAs

¹⁷For example, see Hinojosa-Ojeda, Lewis, and Robinson (1995).

or, for that matter, global liberalization? Analysis with neoclassical models seems to get the sign right, but the magnitude wrong — trade liberalization in these models leads to welfare gains, but empirically they appear to be too small considering the experience of countries which shifted to “open” development strategies. The failure of the neoclassical Ricardian model to provide an adequate empirical framework for explaining the growth of open economies provided a strong impetus to trade economists to explore other links between trade and economic performance. The development of “new trade theory” is at least partly a reaction to this failure, as trade economists undertook a search for large numbers.

In new trade theory, both theoretical and empirical models have moved beyond looking only at neoclassical market structures to incorporate features such as increasing returns, imperfect competition, technology transfers, trade externalities, and dynamic effects such as links between trade liberalization, total factor productivity growth, and capital stock accumulation. These effects are potentially large, and studies incorporating them appear to capture better the stylized facts characterizing growth in countries that shifted from “closed” to “open” strategies. Empirical studies of RTAs incorporating elements of new trade theory invariably find that trade creation greatly dominates trade diversion and, usually, there is no trade diversion at all since the increased growth of RTA members leads to expanded trade both within the RTA and between member countries and the rest of the world.

A. New Trade Theory

Brown (1993) and Francois and Shiells (1994) describe empirical models with new trade theory features and discuss the implications for trade liberalization. Brown describes the evolution of models from (1) static models with neoclassical market structures to (2) static models with monopolistic competition and increasing returns to scale and (3) dynamic models in which exogenous variables are updated using projected values or agents optimize production and consumption decisions intertemporally. DeRosa (1998) and Baldwin and Venables (1995) also consider models with new trade theory features, but do not provide analysis of the model features.

In all cases, the welfare gains from an RTA are greater as the models become more sophisticated. When the models incorporate imperfect competition and increasing returns to scale, for example, trade liberalization allows producers to realize economies of scale. Brown finds that Mexico's gain from NAFTA, measured as the percent increase in real income, is always bigger with increasing returns to scale, often by an order of magnitude. Likewise, Francois and Shiells find that models with some form of imperfect competition yield larger results than those with perfect competition.

Trade externalities are another change in the production process associated with an RTA (or any agreement which expands trade). Increased competition may induce domestic producers to operate more efficiently. Lewis, Robinson, and Wang (1995) explore the effects of trade externalities by linking total factor productivity in a sector to its share of exports in production.

They find that Asian FTA is beneficial to all members when there are trade-productivity links: GDP, absorption, and consumption all rise for all participants.

The welfare gains of an RTA are bigger still in models that incorporate dynamics. Modelers include dynamics either by: (1) specifying a time path for one or more of the exogenous variables and resolving the static model each period with the new values; (2) endogenizing the growth of some variables in the system; or (3) solving all time periods simultaneously with intertemporal optimization by producers and consumers. As Brown (1993); Brown, Deardorff, and Stern (1992); and Robinson and others (1993) find an exogenous increase in Mexico's capital stock in conjunction with NAFTA leads to greater welfare gains for Mexico. As Brown notes, “the addition of international capital flows suggests still larger welfare gains for Mexico of 4 to 7 percent (of GNP). Endogenizing productivity growth produces much larger welfare effects, possibly in the range of 10 percent of Mexican GNP.” (p. 57).

B. Smith versus Ricardo

While the literature on new trade theory is quite large, there is unease in the profession as to whether we have correctly identified the major effects at work. The research program is still active and involves a continuing interplay between theory, econometric estimation, and the development of empirical models incorporating new theoretical features. Empirical results from simulation models such as CGE models have played an important part in this work program by quantifying, in a general equilibrium framework, the mechanisms identified in new theoretical models.

As noted earlier, one of the “stylized facts” characterizing the formation of some RTAs is a rapid increase in intra-industry trade, especially in intermediate goods. Trade-focused CGE models capture this phenomenon by specifying that foreign goods are imperfect substitutes for domestically produced goods, which allows two-way trade (or “cross hauling”) at the sectoral level. Increases in intra-sectoral trade are often a major source of trade creation in these models. But the models do not attempt to sort out the nature of such trade at the micro level. The underlying motivation cannot really be Ricardian differences in factor proportions, since we observe increased trade in sectors where factor proportions are similar across countries.

We conjecture that increases in intra-sectoral trade arise from the fact that an RTA provides an expanded secure market, and permits firms to pursue economies of fine specialization. In North America, for example, the auto industry has become incredibly diffused, with factories specializing in various parts located in different countries supplying assembly plants. Such diffusion of production would be impossible if international borders represented serious and uncertain barriers to the free flow of components. The RTA provides producers scope for fine specialization extending beyond national markets. In this environment, efficiency gains from increased trade in an RTA arise from economies of scale in fine specialization — Adam Smith’s

pin factory in international markets.¹⁸ These efficiency gains do not arise from differences in factor endowments but from the extent of the market — they are Smithian, not Ricardian:

“As it is the power of exchanging that gives occasion to the division of labor, so the extent of this division must always be limited by the extent of that power, or, in other words, by the extent of the market.” (Adam Smith, *The Wealth of Nations*).

Wood (1995) notes that production processes in developed and developing countries are already so different, that “developed countries have become specialized producers of skill-intensive manufactures and imports of labor-intensive manufactures are now “noncompeting” with domestic production” (p. 65).¹⁹ We extrapolate from Wood’s description of production differences between developed and developing countries and argue that such specialization may also generate additional efficiency gains from an RTA. When countries have incentives to increase trade, perhaps arising from Ricardian differences in factor endowments, and form an RTA that provides an integrated, secure market, then there will also be incentives for producers to exploit Smithian gains as well. From this perspective, it is shortsighted to focus on Meade-Viner trade creation/trade diversion issues when assessing the impact of RTAs, since there may well be potential Smithian gains not considered in the standard model.

V. Membership Issues

Important to the theoretical debate is whether RTAs are “building blocs or stumbling blocs” on the route to multilateral free trade.²⁰ Is there an incentive for RTAs to expand and does this support or hinder further multilateral trade liberalization? A related issue is whether there is some natural or optimal number of blocs in terms of global welfare and negotiating strategies in multilateral free trade talks. Krugman (1993) uses an analytical model to demonstrate that welfare is higher at small and large number of blocs, and is minimized with three blocs. Frankel, Stein, and Wei (1995) elaborate on Krugman’s model and show that an RTA formed along natural continental lines can also reduce welfare under certain conditions (such RTAs are termed “super-natural”).

¹⁸Note that these productivity gains are different from welfare gains to demanders from increased product diversity, as suggested by Dixit and Stiglitz (1977). These “Smithian” gains would apply to intermediate goods as well as goods for final demand.

¹⁹Wood uses this description of production in developed versus developing countries to argue that factor content studies underestimate the impact imports have on demand for unskilled labor in developed countries. They must account for the fact that differences in factor costs between developed and developing countries mean labor per unit of output differs.

²⁰Bhagwati (1993) originally coined this phrase which characterized the debate over RTAs.

Empirical models can offer some insights into these issues. In general, studies find that there are incentives for countries to participate in FTAs. The results support the domino theory of regionalism as described in Baldwin and Venables (1995). Brown, Deardorff, and Stern (1994) simulate an expansion of NAFTA, adding one Latin American country at a time. They find that, as NAFTA expands, there are welfare gains for the new members and the welfare gains for the included countries increase. Similarly, Brown, Deardorff, and Stern (1996) describe the effects of an East Asian trade bloc. They begin with trade liberalization between Japan and South Korea. They add, incrementally, Taiwan and Singapore. They find that welfare increases for the included partners as well as the new partner as the East Asian trade bloc expands.

Empirical models also find that the type of membership matters. Lewis, Robinson, and Wang (1995) analyze the implications of different memberships in an FTA among APEC countries. They find that there are gains from making the APEC FTA as broad as possible. Omitting any one region makes that region significantly worse off, and also lowers the gains from the FTA for all members. Exclusion of the U.S. has the greatest negative impact on all potential members. Furthermore, they find that all countries individually gain more from global liberalization than they do from joining an APEC FTA alone. While the formation of a regional RTA may be politically easier than achieving continued global liberalization, there are economic incentives for all parties to expand on the achievements of the completed GATT round. Hinojosa-Ojeda, Lewis, and Robinson (1995) experiment with an extension of NAFTA to include Central America and the Caribbean. They find that the U.S. and Mexico each prefers to be the sole hub, adding “spokes” through bilateral agreements with new countries, but without full expansion of the RTA. It is the worst outcome for either the U.S. or Mexico to be just a spoke while the other country is the hub — they gain more from expansion of the RTA (although, particularly for the U.S., the numbers are small).

The U.S. International Trade Commission (1998) survey of studies of trade liberalization among APEC countries finds a similar conclusion in studies that look at membership issues: “ASEAN countries gain the most from the broadest possible regional liberalization.” (p. 17). Furthermore, they note that the presence of large countries, the U.S. and Japan, is important for other ASEAN members.

Benjamin (1994) uses an empirical model to address Krugman's description of the relationship between global welfare and the size of an RTA. She varies the countries included in a variety of potential RTAs. She finds that, in all cases, trade liberalization increases the volume of world trade and generates positive welfare gains. She notes that there can be trade diversion and that not all countries in the world will benefit. Contradicting Bhagwati and Panagariya, who claim that higher trade dependency among potential partners reduces welfare because of tariff revenue diverted (conclusions they draw from a theoretical model with only trade diversion), she finds that higher trade volumes between potential bloc partners enhance benefits to bloc partners and increase the efficiency gains from tariff reduction.

VI. What do RTAs Mean for Agriculture?

Agricultural sectors are more complex in an RTA because, until recently, agriculture was excluded from GATT negotiations. Many countries have domestic support programs for agriculture and these programs usually conflict with trade liberalization. To the extent that an RTA can induce countries to reform domestic support programs, an RTA encourages deeper integration among its members.

Burfisher and Jones (1998) survey empirical studies which focus on the implication of a variety of RTAs for U.S. agriculture. They find the following:

- U.S. agriculture can gain from participating in various RTAs. The international terms of trade facing the U.S. in agriculture are expected to improve, with an increase in farm export prices relative to import prices.
- U.S. agriculture can lose when not a member of RTAs because they divert trade from U.S. agriculture.
- Agriculture is the source of most U.S. gains from RTAs. Because agriculture still faces relatively high trade barriers in world markets, its inclusion in trade agreements accounts for much of the U.S. gains from RTAs.
- RTAs limit the ability of member countries to maintain independent farm programs.

Consistent with economy-wide models that do not focus on agriculture, they find that aggregate trade creation dominates trade diversion. Moreover, RTAs are generally net trade creating in agriculture; and, in some cases, there is no aggregate trade diversion.²¹

Hertel and others (1997), also describe economywide models of trade liberalization with a focus on agriculture and domestic policy distortions. They find that domestic distortions can offset trade diversion effects. For example, as the EU expands to incorporate seven of the Central and Eastern European countries (CEEC), the rest of the EU benefits from replacing subsidized domestic farm output with imports from new members.²² Liapis and Tsigas (1998) also examine the effect of EU expansion to include CEEC. In their simulation, the CEEC participate in the EU

²¹They note that the Australia-New Zealand Closer Economic Relations (CER), the Canada-U.S. Free Trade Agreement (CUSTA), and Mercosur have all led to increased agricultural trade with both partners and nonmembers, supporting the view that RTAs can unleash growth in trade that benefits members and nonmembers alike.

²²In this analysis, they assume that producer subsidies under the Common Agricultural Program (CAP) are not extended to the Central and Eastern European countries who are the low cost producers of agriculture.

budget and receive CAP payments. They find trade diversion in agricultural products as EU imports from third countries are replaced by CEEC countries who now receive output subsidies in agriculture. However, it is net trade creating in the aggregate, as they report that the trade balance increases in all regions, except the CEEC.²³

Burfisher, Robinson, and Thierfelder (1998) examine the interaction between domestic reforms and NAFTA. They consider the impact of trade liberalization among the U.S., Canada, and Mexico in a model with and without domestic policy reform. In general, domestic reforms have both lowered support levels and “decoupled” payments by making them independent of farmers’ production decisions or market conditions. The reforms have made the region’s agriculture more market-driven. Burfisher and others show that, in the new farm-program environment, the change in the sectoral structure of agriculture is greater, and welfare gains are larger compared with the effects of NAFTA under pre-NAFTA farm programs. When countries reform domestic policies in conjunction with NAFTA, all experience welfare gains. Consistent with other models surveyed, Burfisher and others find that trade creation greatly exceeds trade diversion.

The models with agricultural detail reinforce the message from economy-wide models described earlier — trade creation dominates trade diversion. Furthermore, they show that there are additional gains when the RTAs induce countries to reform domestic policies.

VII. Conclusions

The theoretical debate over RTAs raises a number of issues. A fundamental question is, are RTAs net trade creating or trade diverting? Related to that concern, do RTAs improve welfare and if so, what are the sources of these gains? Finally, are RTAs building blocs or stumbling blocs to increased multilateral trade liberalization?

There is a large body of empirical literature which offers answers to these questions. In this paper, we summarize the lessons from multi-country CGE models of RTAs. We find:

- Trade creation greatly exceeds trade diversion in virtually all RTAs studied. In general, welfare for all members increases. Furthermore, welfare for old members increases as new members join the RTA, suggesting that there are gains from expanding the RTA.
- Features from new trade theory such as imperfect competition, increasing returns to scale, trade externalities, or dynamics generate big welfare gains, compared to models incorporating only neoclassical production structures.

²³In their model, changes in the CEEC reflect both tariff reduction and output subsidies to agriculture under the CAP which bias production towards agriculture. They note that there is an increase in import demand for nonagricultural products in the CEEC.

- Domestic policy reforms in conjunction with an RTA provide additional welfare gains. Models with detailed agricultural sectors illustrate this point.

We conclude with some new leads in the search for big numbers. Empirical models indicate that neoclassical market structures yield small welfare gains, the big numbers come when one specifies aspects of new trade theory. We describe another type of new link between increased trade and productivity — RTAs, which create reliable market access, will encourage finer specialization in production. The productivity gains from increased trade in this situation are Smithian rather than Ricardian, and represent an interesting area for future research.

References

- Baldwin, Richard E. and Anthony J. Venables (1995). "Regional Economic Integration," in Gene Grossman and Kenneth Rogoff (eds.), *Handbook of International Economics, Vol. III*, Elsevier, Amsterdam.
- Benjamin, Nancy, (1994). "Notes on CGE Model Simulations of Regional Trade Agreements," Office of Economics Working Paper, U.S. International Trade Commission, Washington D.C.
- Bhagwati, Jagdish (1993). "Regionalism and Multilateralism: an Overview," in De Melo, Jaime and Arvind Panagariya (eds.), *New Dimensions in Regional Integration*. Cambridge: Cambridge University Press.
- Bhagwati, Jagdish and Anne Krueger (1995). *The Dangerous Drift to Preferential Trade Agreements*. Washington: AEI Press.
- Bhagwati J. and Arvind Panagariya (1996). *The Economics of Preferential Trade Agreements*, Washington, D.C.: AEI Press.
- Brown, Drusilla K. (1993). "The Impact of a North American Free Trade Area: Applied General Equilibrium Models," in Nora Lusting, Barry P. Bosworth, and Robert Z. Lawrence, (eds.) *Assessing the Impact, North American Free Trade*, Washington, D.C.: The Brookings Institution.
- Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern (1992). "A North American Free Trade Agreement: Analytical Issues and a Computational Assessment," *The World Economy*, Vol. 15, p. 15-29.
- Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern (1995). "Expanding NAFTA: Economic Effects of Accession of Chile and other Major South American Nations," *North American Journal of Economics and Finance*, Vol. 6, no.2, pp. 65-85.
- Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern (1996). "Computational Analysis of the Economic Effects of an East Asian Preferential Trading Bloc," *Journal of the Japanese and International Economies*, Vol. 10, pp. 37-70.
- Burfisher, Mary E. and Elizabeth A. Jones, eds. (1998). *Regional Trade Agreements and U.S. Agriculture*, Economic Research Service, AER No. 771. Washington, DC: U.S. Department of Agriculture.

- Burfisher Mary E., Sherman Robinson and Karen Thierfelder (1992). "Agricultural and Food Policies in a United States-Mexico Free Trade Area," *North American Journal of Economics and Finance*, Vol 3, no. 2, pp. 117-139.
- Burfisher Mary E., Sherman Robinson and Karen Thierfelder (1998). "Farm Policy Reforms and Harmonization in the NAFTA," in Burfisher, Mary E. and Elizabeth A. Jones, eds. *Regional Trade Agreements and U.S. Agriculture*, Economic Research Service, AER No. 771. Washington, DC: U.S. Department of Agriculture.
- Coyle, William and Zhi Wang (1998). "Economic Integration and Open Regionalism in APEC: the Gains for U.S. Agriculture," in Burfisher, Mary E. and Elizabeth A. Jones, eds. *Regional Trade Agreements and U.S. Agriculture*, Economic Research Service, AER No. 771. Washington, DC: U.S. Department of Agriculture.
- De Melo, Jaime, Arvind Panagariya and Dani Rodrik (1993). "The New Regionalism: A Country Perspective," in De Melo, Jaime and Arvind Panagariya (eds.), *New Dimensions in Regional Integration*. Cambridge: Cambridge University Press.
- De Melo, Jaime and Arvind Panagariya (1993). *New Dimensions in Regional Integration*. Cambridge: Cambridge University Press.
- DeRosa, Dean A. (1998). Regional Integration Arrangements: Static Economic Theory, Quantitative Findings, and Policy Guidelines, background paper for a World Bank Policy Research Report, *Regionalism and Development*.
- Dixit, Avinash and Joseph E. Stiglitz (1977). "Monopolistic Competition and Optimum Product Diversity." *American Economic Review*, Vol 67, pp. 297-308.
- Ethier, Wilfred J (1998). "The New Regionalism," *The Economic Journal*, Vol**, no**, pp. 1149 - 1161.
- Francois, Joseph F. and Clinton R. Shiells (1994). "AGE Models of North American Free Trade," in Joseph F. Francois and Clinton R. Shiells, eds. *Modeling Trade Policy, Applied General Equilibrium Assessments of North American Free Trade*, Cambridge: Cambridge University Press.
- Frankel, Jeffrey and E. Stein, and S. Wei (1995). "Trading Blocs and the Americas: The Natural, the Unnatural and the Super-Natural," *Journal of Development Economics*, Vol. 47, pp. 61-95.
- Gehlhar, Mark J. (1998). "Multilateral and Regional Trade Reforms: A Global Assessment from a U.S. Perspective," in Mary E. Burfisher, and Elizabeth A. Jones, eds. *Regional Trade*

- Agreements and U.S. Agriculture*, Economic Research Service, AER No. 771.
Washington, DC: U.S. Department of Agriculture.
- Grubel, Herbert G. and P. J. Lloyd (1971). "The Empirical Measurement of Intra-Industry Trade." *Economic Record*, Vol. 47, No. 120, pp. 494-517.
- Hertel, Thomas W., William M. Masters and Mark J. Gehlhar (1997). "Regionalism in World Food Markets: Implications for Trade and Welfare," Plenary paper for the XXIII International Conference of Agricultural Economists, August 10-16, 1997, Sacramento, California.
- Hinojosa-Ojeda, Raul, Jeffrey D. Lewis and Sherman Robinson (1995). "Regional Integration Options for Central American and the Caribbean after NAFTA," *North American Journal of Economics and Finance*, Vol. 6, no. 2, pp. 121-148.
- Krugman Paul (1993). "Regionalism versus Multilateralism: Analytical Notes," in De Melo, Jaime and Arvind Panagariya (eds.), *New Dimensions in Regional Integration*. Cambridge: Cambridge University Press
- Lewis, Jeffrey D., Sherman Robinson, and Zhi Wang (1995). "Beyond the Uruguay Round: The Implications of an Asian Free Trade Area," *China Economic Review*, Vol. 6, no. 1, pp. 35-90.
- Lewis, Jeffrey D. and Sherman Robinson (1996). "Partners or Predators? The Impact of Regional Trade Liberalization on Indonesia," Policy Research Working Paper 1626, Washington D.C.: The World Bank.
- Liapis, Peter S. and Marinos E. Tsigas (1998). "CEEC Accession to the EU: A General Equilibrium Analysis," in Burfisher, Mary E. and Elizabeth A. Jones, eds. *Regional Trade Agreements and U.S. Agriculture*, Economic Research Service, AER No. 771.
Washington, DC: U.S. Department of Agriculture.
- Panagariya, Arvind (1998). "The Regionalism Debate: An Overview," Center for International Economics, Department of Economics, University of Maryland at College Park, Working paper No. 40.
- Panagariya, Arvind (1996). "The Free Trade Area of the Americas: Good for Latin America?" *The World Economy*, Vol. 19, no 5. pp. 485 - 516.
- Robinson, Sherman, Mary E. Burfisher, Raul Hinojosa-Ojeda, and Karen Thierfelder (1993). "Agricultural Policies and Migration in a U.S.-Mexico Free Trade Area: A Computable General Equilibrium Analysis," *Journal of Policy Modeling*, Vol 15 nos. 5&6, pp. 673-701.

- Srinivasan, T. N. (1998). *Developing Countries and the Multilateral Trading System*. Boulder, CO.: Westview Press.
- U.S. International Trade Commission (1998). *The Economic Implications of Liberalizing APEC Tariff and Nontariff Barriers to Trade*, Publication 3101, April.
- U.S. International Trade Commission (1992). *Economy-Wide Modeling of the Economic Implications of a FTA with Mexico and a NAFTA with Canada and Mexico*, Publication 2516, May.
- Whalley, John (1993). "Regional Trade Agreements in North America: CUSTA and NAFTA," in De Melo, Jaime and Arvind Panagariya (eds.), *New Dimensions in Regional Integration*. Cambridge: Cambridge University Press
- Winters, L. Alan (1996). Regionalism versus Multilateralism. Policy Research Working Paper 1687, World Bank, Washington D.C.
- Wonnacott, Ronald J. (1996). "Free Trade Agreements: For Better or Worse?" *American Economic Review*, Vol. 86, no.2.
- Wood, Adrian (1995). "How Trade Hurt Unskilled Workers," *Journal of Economic Perspectives*, Vol. 9, no.3, pp.57-80.
- Yeats, Alexander J. (1998). "Does Mercosur's Trade Performance Raise Concerns about the Effects of Regional Trade Arrangements?" *The World Bank Economic Review*, Vol. 12, no.1, pp. 1 - 28.

Table 1: Summary of Selected Empirical Studies of Regionalism			
Study	Country Coverage	Model Description	Key Results
Western Hemisphere:			
Brown, Deardorff, and Stern (1992)	Canada, U.S., Mexico and an aggregate of 31 other countries	23 tradable products, 6 nontraded, monopolistic competition in non-agricultural and non-service sectors; model these sectors as requiring fixed inputs of capital and labor, products are differentiated by firm; set price as an optimal mark-up over marginal cost, number of firms in each industry insure that there are zero profits SCENARIOS: (1) trade liberalization among the US, Mexico and Canada with an increase in US quotas on Mexican agriculture, food, textiles and clothing; (2) (1) plus 10% increase in Mexico's capital stock; the same two done with out Canada	There is some trade diversion as NAFTA reduces the volume of trade between NAFTA countries and the other 31 country; welfare improves for all three NAFTA countries (due to efficiency gains and ability to exploit economies of scale in the imperfectly competitive sectors) For US and Canada, gains are primarily from increased product variety; Mexican exporters gain are concentrated in agriculture, semi-manufacturing, and some heavy industry.
Brown, Deardorff and Stern (1995)	Canada, U.S., Mexico (NAFTA), Chile, Argentina, Brazil and Colombia	Same commodities and market structure as in (1992) model SCENARIOS: begin with NAFTA (tariff elimination between US, Mexico and Canada), add sequentially, Chile, Argentina, Colombia and Brazil	there are welfare gains from NAFTA alone for those 3 countries (base case) where welfare is the EV as a % of GDP; in general, when NAFTA adds new members, welfare gains for the new member and welfare gains for the included partners increases; scale effects of increased output mean that both factors gain in all countries (except Chile which experience scale gains the most in one of the most capital intensive sectors).
Burfisher, Robinson, and Thierfelder (1992)	U.S. and Mexico	28 sectors, 20 of which are farm and food processing sectors; four labor categories, two land types and capital; 3 migration flows: (1) rural - urban unskilled in Mexico, (2) Mexican urban unskilled - U.S. urban unskilled, and (3) Mexican rural - U.S. rural; agricultural policies modeled endogenously or exogenously, depending upon the nature of the policy represented SCENARIOS: (1) tariff elimination only; (2)tariff and quota elimination (FTA); (3) an FTA with removal of all Mexican domestic subsidies to farm and food processing sectors; (4) FTA with deficiency payment to Mexican corn farmers; (5) FTA with a 10 percent increase in Mexico's capital stock	real GDP increases slightly for both U.S. and Mexico under tariff elimination and under tariff and quota elimination; an FTA generates some trade diversion for Mexico, none for the U.S. but trade creation dominates; Mexico's real GDP grows 7.4 percent following the growth of Mexico's capital stock in conjunction with an FTA, in contrast, Mexico's real GDP increases 0.2 percent with an FTA alone.

Study	Country Coverage	Model Description	Key Results
Burfisher, Robinson and Thierfelder (1998)	Canada, U.S., Mexico	25 sectors, 18 farm and food processing sectors; endogenous agricultural programs for each country; SCENARIOS: (1) NAFTA with no domestic farm policy reform; (2) NAFTA with domestic farm policy reform	trade creation exceeds trade diversion; NAFTA with no domestic reform raises welfare for the U.S. and Canada, but welfare declines in Mexico because distorting agricultural policies such as the guaranteed price for corn, remain in place; welfare gains are bigger for all countries (and positive for Mexico) when trade liberalization occurs in a reformed environment.
Hinojosa-Ojeda, Lewis, and Robinson (1995)	U.S., Mexico, Central America and Caribbean	11 sectors, 4 labor categories, rural-urban migration within Mexico, Central America, and the Caribbean; international migration in rural and urban unskilled labor categories; import structure and trade externalities as described in Lewis, Robinson, and Wang (1995) below. SCENARIOS: NAFTA and a variety of alternative scenarios of regional integration among Mexico and other countries in the model and the U.S. and other countries in the model; accession of both Central America and the Caribbean to NAFTA	NAFTA generates more trade creation than diversion; the U.S. and Mexico prefer to be the sole hub of a regional trading system, yet it is the worst outcome for either the U.S. or Mexico to be just a spoke in a new regional trading system; an FTA between NAFTA, Central America and the Caribbean provides the best outcome in terms of total real GDP and total exports for the region (although it is not the best outcome for all countries).
Yeats (1998)	Mercosur countries: Argentina, Brazil, Paraguay, and Uruguay	micro-study of 128 3 digit SITC products that include all manufactured goods, processed food and processed raw materials; calculated regional orientation index for each product as the ratio of the share of export of good j in total exports to the region over the share of exports of good j to other countries out of total share of exports to other countries; and the revealed comparative advantage index as ratio of the share of exports of good j to the other countries over the share of world exports of good j to total world exports	Mercosur has become less internationally competitive in products where trade was reorienting most rapidly toward the region; attributes this change in trade pattern to the discriminatory nature of Mercosur trade policies

Study	Country Coverage	Model Description	Key Results
Europe:			
Liapis and Tsigas (1998)	U.S., EU-12 (the 12 members prior to the 1995 expansion), EU-3 (Austria, Finland, and Sweden), CEEC-7 (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic and Slovenia), Newly Independent States and Baltics, Middle East and North Africa, Countries of European Free Trade Area and the rest of world	general equilibrium model using GTAP modeling structure; analyze the effect of CEEC-7 joining the EU: remove all trade barriers between CEEC-7 and the EU, harmonize output subsidies and import protection, participation of CEEC-7 in the EU budget	trade diversion in agricultural products as EU imports from third countries are displaced by CEEC countries (these results, reflect the output subsidies to agriculture in the CEEC countries, not just the effects of tariff elimination); welfare for the world improves; in the CEEC the gains are due to terms of trade effects which dominate the distortionary effects of CAP payments to agriculture; welfare in the EU declines due to budgetary cost of CAP payments to CEEC and strong terms of trade deterioration as import prices increase as tariffs on CEEC agriculture are eliminated (and the EU is producing less agriculture so must import more)
Asia:			
Brown, Deardorff, and Stern (1996)	Japan, Singapore, South Korea, Taiwan, U.S., Canada, Mexico, and rest of world	Same commodities and market structure as in (1992) model; SCENARIOS: (1) Japan/South Korean tariff elimination; (2) Japan/South Korea/Taiwan tariff elimination; (3) Japan/South Korea/Taiwan/ Singapore tariff elimination; (4) (3) plus relaxing existing nontariff barriers (NTBs) by 50%; (5) (3) plus the U.S.; (6) (5) plus relaxing existing NTBs by 50%	welfare tends to increase for the included partners as well as the new partner as the East Asian trading bloc is expanded; scale effects contribute to welfare gains and an increase in both factor returns in most countries.
Coyle and Wang (1998)	U.S., Canada, Japan, Australia, Korea, Taiwan (newly industrialized economies of APEC), Mexico, China and ASEAN (all other APEC countries)	dynamic model in the sense that there are updates based on outside projections of four sources of economic growth (labor force, capital stock, changes in skill composition of labor force, and total factor productivity growth); SCENARIOS: (1) world economic growth with Uruguay round and Nafta trade liberalization; (2) APEC trade liberalization MFN basis; (3) APEC trade liberalization within the region; (4) global trade liberalization in which non-APEC members also reform policies.	overall welfare gain regardless of liberalization approach; agriculture is a major contributor to the overall gains because there are high initial protection rates for food and agricultural products in East Asia; Trade creation dominates trade diversion in all scenarios, there is some trade diversion

Study	Country Coverage	Model Description	Key Results
Lewis, Robinson, and Wang (1995)	U.S., Japan, EU, Asian NIEs (Korea, Taiwan, and Singapore), China (including Hong Kong) and ASEAN4 (Indonesia, Thailand, Philippines, and Malaysia)	10 sectors, two labor types, almost ideal demand system (AIDS) specification of import demand which allows import expenditure elasticities to differ from one and also allows cross-country substitution elasticities to vary for different pairs of countries; trade externalities: (1) total factor productivity grows with increased exports; (2) productivity increase with increases in imports of intermediate and capital goods; (3) aggregate exports make physical capital more productive (represented by an increase in the capital stock input to production) SCENARIOS: (1) Asian Free trade area; (2) implications of excluding a country from the FTA — China, ASEAN4, and the U.S.; (3) Asian FTA versus more comprehensive free trade	formation of an Asian FTA is generally beneficial for its members, although the benefits range from quite small (for the U.S. and China) to moderate (for the Asian NIEs); trade creation exceeds trade diversion by a factor of four; all FTA members gain from the FTA when they account for improved trade performance and productivity, the gains are quite substantial for ASEAN4 and Asian NIEs; when a region is excluded, it suffers losses in GDP, absorption, consumption and exports, while the members of the smaller FTA gain less than in the case of a broader FTA.
Lewis and Robinson (1996)	Indonesia, Thailand, Philippines, Malaysia and Singapore (together), China (including Hong Kong), Asian NICs (Korean and Taiwan), the U.S., Japan and the EU; 12 sectors and 2 labor types.	Same import demand and trade externalities as in Lewis, Robinson, and Wang (1995); SCENARIOS: (1) Uruguay Round Agreement commitments for APEC economies; (2) adoption of an ASEAN FTA; (3) a possible APEC FTA; (4) global trade liberalization involving areas outside of Asia	an APEC free trade area provides significant benefits to the participants, with little effect on non-members, there is some trade diversion away from non-members, but total trade creation is much larger and leads to significant efficiency gains; however, even greater gains are achieved by further multilateral liberalization; the creation of an ASEAN FTA provides little benefits to its members.
General Studies:			
Benjamin (1994)	10 countries: US, Canada, EU, Japan, China, Asian Tigers, Australia-New Zealand, South East Asia, Latin America and ROW	multicountry CGE model used to simulate the effects of multilateral free trade versus a variety of regional trade agreements formed with different combinations of the 10 countries in the model	RTAs almost always create trade and increase global welfare, although there can be notable trade diversion and not all countries in the world will benefit; large developed countries fare best under wide-spread liberalization; higher trade volumes between potential bloc partners means enhanced benefit to bloc partners and higher efficiency gains from tariff reduction.

LIST OF TMD DISCUSSION PAPERS

- No. 1 - “Land, Water, and Agriculture in Egypt: The Economywide Impact of Policy Reform” by Sherman Robinson and Clemen Gehler (January 1995)
- No. 2 - “Price Competitiveness and Variability in Egyptian Cotton: Effects of Sectoral and Economywide Policies” by Romeo M. Bautista and Clemen Gehler (January 1995)
- No. 3 - “International Trade, Regional Integration and Food Security in the Middle East” by Dean A. DeRosa (January 1995)
- No. 4 - “The Green Revolution in a Macroeconomic Perspective: The Philippine Case” by Romeo M. Bautista (May 1995)
- No. 5 - “Macro and Micro Effects of Subsidy Cuts: A Short-Run CGE Analysis for Egypt” by Hans Löfgren (May 1995)
- No. 6 - “On the Production Economics of Cattle” by Yair Mundlak, He Huang and Edgardo Favaro (May 1995)
- No. 7 - “The Cost of Managing with Less: Cutting Water Subsidies and Supplies in Egypt's Agriculture” by Hans Löfgren (July 1995, Revised April 1996)
- No. 8 - “The Impact of the Mexican Crisis on Trade, Agriculture and Migration” by Sherman Robinson, Mary Burfisher and Karen Thierfelder (September 1995)
- No. 9 - “The Trade-Wage Debate in a Model with Nontraded Goods: Making Room for Labor Economists in Trade Theory” by Sherman Robinson and Karen Thierfelder (Revised March 1996)
- No. 10 - “Macroeconomic Adjustment and Agricultural Performance in Southern Africa: A Quantitative Overview” by Romeo M. Bautista (February 1996)
- No. 11 - “Tiger or Turtle? Exploring Alternative Futures for Egypt to 2020” by Hans Löfgren, Sherman Robinson and David Nygaard (August 1996)
- No. 12 - “Water and Land in South Africa: Economywide Impacts of Reform - A Case Study for the Olifants River” by Natasha Mukherjee (July 1996)
- No. 13 - “Agriculture and the New Industrial Revolution in Asia” by Romeo M. Bautista and Dean A. DeRosa (September 1996)

- No. 14 - “Income and Equity Effects of Crop Productivity Growth Under Alternative Foreign Trade Regimes: A CGE Analysis for the Philippines” by Romeo M. Bautista and Sherman Robinson (September 1996)
- No. 15 - “Southern Africa: Economic Structure, Trade, and Regional Integration” by Natasha Mukherjee and Sherman Robinson (October 1996)
- No. 16 - “The 1990's Global Grain Situation and its Impact on the Food Security of Selected Developing Countries” by Mark Friedberg and Marcelle Thomas (February 1997)
- No. 17 - “Rural Development in Morocco: Alternative Scenarios to the Year 2000” by Hans Löfgren, Rachid Doukkali, Hassan Serghini and Sherman Robinson (February 1997)
- No. 18 - “Evaluating the Effects of Domestic Policies and External Factors on the Price Competitiveness of Indonesian Crops: Cassava, Soybean, Corn, and Sugarcane” by Romeo M. Bautista, Nu Nu San, Dewa Swastika, Sjaiful Bachri, and Hermanto (June 1997)
- No. 19 - “Rice Price Policies in Indonesia: A Computable General Equilibrium (CGE) Analysis” by Sherman Robinson, Moataz El-Said, Nu Nu San, Achmad Suryana, Hermanto, Dewa Swastika and Sjaiful Bahri (June 1997)
- No. 20 - “The Mixed-Complementarity Approach to Specifying Agricultural Supply in Computable General Equilibrium Models” by Hans Löfgren and Sherman Robinson (August 1997)
- No. 21 - “Estimating a Social Accounting Matrix Using Entropy Difference Methods” by Sherman Robinson and Moataz-El-Said (September 1997)
- No. 22 - “Income Effects of Alternative Trade Policy Adjustments on Philippine Rural Households: A General Equilibrium Analysis” by Romeo M. Bautista and Marcelle Thomas (October 1997)
- No. 23 - “South American Wheat Markets and MERCOSUR” by Eugenio Díaz-Bonilla (November 1997)
- No. 24 - “Changes in Latin American Agricultural Markets” by Lucio Reca and Eugenio Díaz-Bonilla (November 1997)
- No. 25* - “Policy Bias and Agriculture: Partial and General Equilibrium Measures” by Romeo M. Bautista, Sherman Robinson, Finn Tarp and Peter Wobst (May 1998)
- No. 26 - “Estimating Income Mobility in Colombia Using Maximum Entropy Econometrics” by Samuel Morley, Sherman Robinson and Rebecca Harris (May 1998)
- No. 27 - “Rice Policy, Trade, and Exchange Rate Changes in Indonesia: A General Equilibrium Analysis” by Sherman Robinson, Moataz El-Said, and Nu Nu San (June 1998)

- No. 28* - “Social Accounting Matrices for Mozambique - 1994 and 1995” by Channing Arndt, Antonio Cruz, Henning Tarp Jensen, Sherman Robinson, and Finn Tarp (July 1998)
- No. 29* - “Agriculture and Macroeconomic Reforms in Zimbabwe: A Political-Economy Perspective” by Kay Muir-Leresche (August 1998)
- No. 30* - “A 1992 Social Accounting Matrix (SAM) for Tanzania” by Peter Wobst (August 1998)
- No. 31* - “Agricultural Growth Linkages in Zimbabwe: Income and Equity Effects” by Romeo M. Bautista and Marcelle Thomas (September 1998)
- No.32* - “Does Trade Liberalization Enhance Income Growth and Equity in Zimbabwe? The Role of Complementary Policies” by Romeo M. Bautista, Hans Lofgren and Marcelle Thomas (September 1998)
- No.33 - “Estimating a Social Accounting Matrix Using Cross Entropy Methods” by Sherman Robinson, Andrea Cattaneo, and Moataz El-Said (October 1998)
- No.34 - “Trade Liberalization and Regional Integration: The Search for Large Numbers” by Sherman Robinson and Karen Thierfelder (January 1999)
- No.35 - “Spatial Networks in Multi-Region Computable General Equilibrium Models” by Hans Löfgren and Sherman Robinson (January 1999)

TMD Discussion Papers marked with an "" are MERRISA-related papers.

Copies can be obtained by calling, Maria Cohan at 202-862-5627 or e-mail m.cohan@cgnet.com